2012 High Performance Schools Workshop:

Brooks Elementary School

Bullitt County Schools

SHROUT TATE WILSON *Consulting Engineers*
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Measuring Annual Energy Consumption

Annual energy consumption is measured in kBtu/ft^2/year.

1 kBtu/ft^2/year =

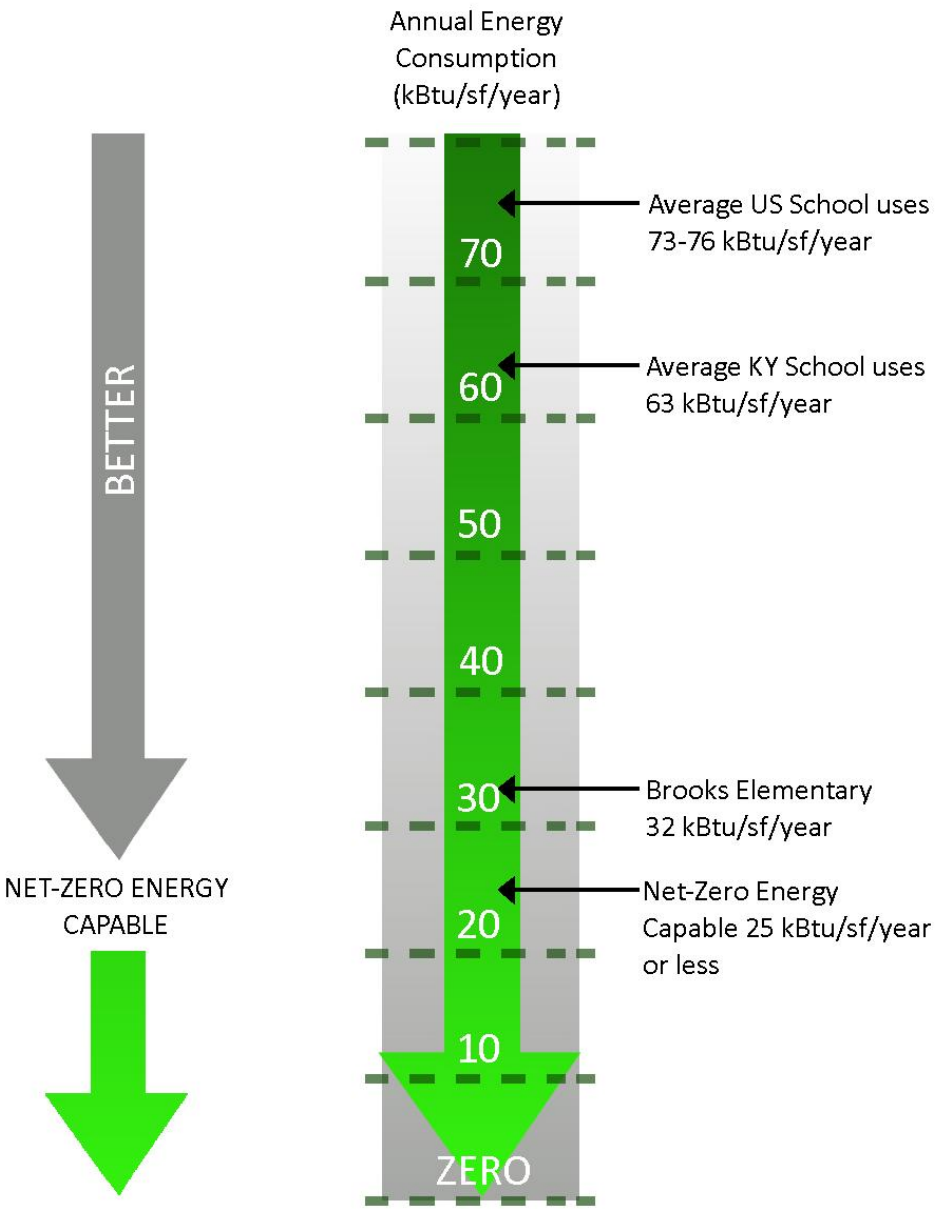
1,000 British thermal units per square foot of building per year

Measuring Annual Energy Consumption

How to calculate your building's kBtu/ft^2/year?

- Annual kwh (kilowatt/hour)
- 1 kwh = 3.412 kBtu
- Divide by total building area

Measuring Annual Energy Consumption



How does your annual energy consumption "stack up?"

Sources: US Dept. of Energy and KY Dept. of Energy

Brooks Elementary School

High Performance Features:

- Insulated Concrete Forms (ICF)
- Additional Roof Insulation
- Geothermal and VRV HVAC Systems
- Building Automation System (BAS)
- Occupancy Sensors
- Programmable lighting controls
- Demand Ventilation

32 kBtu/ft^2/year

How could Brooks Elementary have been Net-Zero Energy Capable?

Getting to Net-Zero Energy Capable

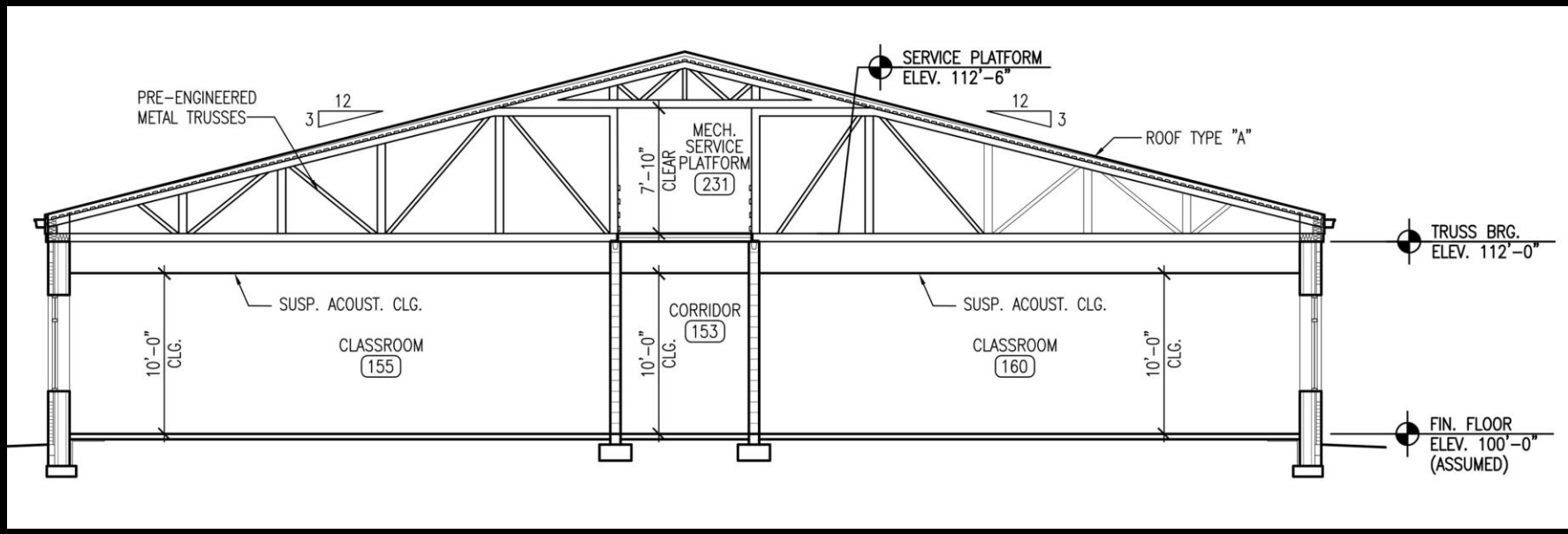
Brooks Elementary =
32 kBtu/ft^2/year

Net-Zero Energy Capable =
25 kBtu/ft^2/year or less

A difference of only
7 kBtu/ft^2/year!

Getting to Net-Zero Energy Capable

Reduction in Building Volume:



Getting to Net-Zero Energy Capable

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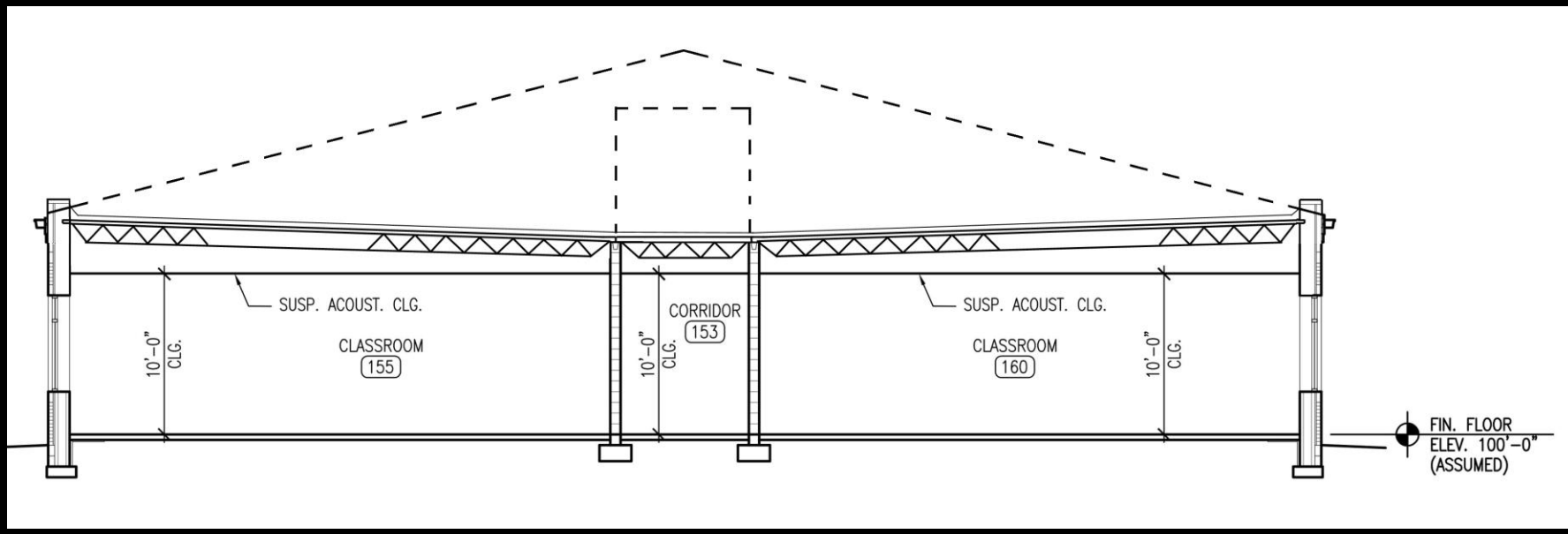

Elimination of Mechanical Service Platform and pitched roof system

Getting to Net-Zero Energy Capable

HVAC Systems:

- Multi-Stage Heat Pump Units
- 1 Heat Pump per 2 Classrooms
- Variable Speed Kitchen Hood for Make-up Air
- Integrate Domestic Water Heating into Heat Pump

Getting to Net-Zero Energy Capable

Electrical Systems:

- Utilize Wireless Technology
- Eliminate Dedicated Computer Outlets (Reduce plug loads)
- Eliminate Dedicated Computer Lab

Getting to Net-Zero Energy Capable

Results:

Incorporating these revisions and systems in future school buildings can provide Bullitt County Schools the opportunity of reducing annual energy consumption by approximately **10** kBtu/ft^2/year.

Why Net-Zero Energy Capable?

- Federal Grants and Incentives for Renewable Energy
- Annual Energy Savings $

Why Net-Zero Energy Capable?

- Federal Grants and Incentives for Renewable Energy
- Annual Energy Savings $

- Building must operate at **25** kBtu/ft^2/year or less.
- Incorporates infrastructure or design for infrastructure for future renewable energy sources.
- Lower energy use = less renewable energy required.

Why Net-Zero Energy Capable?

- Federal Grants and Incentives for Renewable Energy
- Annual Energy Savings $

- Bullitt County:
  1 kBtu/ft^2/year = $2,500.00
- Calculated using local utility costs in Brooks, Kentucky (Salt River Electric)
- Projected annual energy savings $ based on projected annual energy performance
- Every kBtu/ft^2/year counts!

Why Net-Zero Energy Capable?

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